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The Abstract Editor is Dr. George Mannheimer, 41 West 51st Street, New York City. Prompt transmission to him of reprints or abstracts of papers on tuberculosis, sanatorium or board of health reports, etc., will promote their early publication in this section.

Abstracts should be sent typewritten on one side of the page only. They should be as concise and compact as the subject matter of the article warrants. They should be headed with a short title, and followed by the full title of the paper, author's name, journal, date, volume and page.

The Heart in Early Pulmonary Tuberculosis.—In examining a patient for possible phthisis the writer points to the value of the heart examination. The pulmonary second sound in the absence of any organic right ventricular hypertrophy is usually accentuated in early phthisis. The heart of the consumptive is small. Hypertrophied hearts are exceedingly rare in phthisis. If the heart is of normal size in incipient phthisis, it is believed to share in the general cachexia as the disease advances. It has been shown that in proved tuberculosis, with bacilli in the sputum, the accentuation of the pulmonary second sound persists even though percussion of the right heart, X-ray plates and fluoroscopy fail to show any right ventricle hypertrophy. Therefore, when a patient presents himself for examination, and among other findings his pulmonary second sound shows a definite accentuation without cardiac enlargement, it is well to bear in mind the possibility of phthisis.—*A Sign of Value in Early Phthisis, S. Simon, J. Missouri State M. Ass., January, 1921, xviii, 11.*

Importance of Exact Measurement of Intrapleural Pressure in Artificial Pneumothorax.—The author stresses, not the pressure on initiation of pneumothorax, but its record in the course of treatment, for its bearing on processes taking place in the pleural cavity, such as tension on adhesions and displacement of the mediastinum. He uses as his measure of pressure the difference in level of the liquid columns in the two large bottles of the usual apparatus, at the point where no more gas will enter the cavity. His manometer is thus of such calibre, 6 cm. or more, that oscillations are negligible; it records accurately the weight pressing on a given area of lung. This method is compared with the popular one of taking the mean between the respiratory excursions in the small bore manometer; figures are given indicating that the latter method is inaccurate. The injection is made gradually by lifting the bottle from which pressure is derived 1 cm. at a time. This method is slow, but possesses a measure of safety by virtue of that fact. Two absolute requirements for the correct measurement of pressure are a needle, 0.8 to 1 mm. inside diameter, and cotton filters permitting the passage of 600 cc. of gas in from fifteen to twenty seconds. Curves are kept during the process of filling, in which volumes are plotted on the abscissae and pressures on the ordinates. That for a normally collapsing lung is a straight line inclining at about 45 degrees. Variations from this indicate a variety of untoward developments, described in detail with figures in the text. The practice of making curves during the injection is thus

a measure of diagnostic importance.—*Importance des measures exactes de la pression pleurale dans le traitement de la tuberculose pulmonaire par le pneumothorax artificiel (I), G. Küss, Rev. d. l. tuberc., June, 1921, 3rd series, ii, 163.*

Recovery of Respiratory Capacity after Artificial Pneumothorax.—By means of a Chauveau spirometer, adapted for nasal breathing, the volume of air respired after total or partial pneumothorax was measured from day to day in patients at the Sanatorium F. Mangini at Hauteville. Along with the respiratory capacity, in both normal and forced breathing, the rate and the intrapleural pressure were observed. The data, represented as curves, are so superimposed as to show for a patient, at any given time, his respiratory capacity and frequency and the intrapleural pressure. The rapid fall in respiratory capacity that follows the collapse of a lung may equal a fourth of the total capacity before pneumothorax. If the collapse is progressive the fall is less, since compensation is established gradually; the volume measurements, therefore, agree with the clinical experience that less discomfort accompanies the gradual induction of a total pneumothorax. Compensation, produced by increased frequency and greater expansion, is established more easily in young than in older persons, and, perhaps, more easily in men than in women. The total respiratory capacity cannot only be regained, but is even increased. When the normal frequency is reëstablished, the respiratory capacity in normal breathing is greater than it was before the pneumothorax. The frequency, which rises almost at once to its maximum, decreases gradually as capacity increases, but it does not reach normal until after the latter has been fixed for some time at a point above its initial value. These results agree with laboratory findings which show that penumothorax increases pulmonary exchange. Recuperation may be very rapid (fourteen days) or it may be slow; various factors are concerned, such as the formation of the chest, the state of the active lung, age, health, etc. But, in general, the respiratory capacity, after its great initial fall, increases at first very rapidly; then more slowly to its maximum. Forced respiration or capacity after a pneumothorax does not follow so regular a curve as normal respiratory capacity or respiratory frequency. The volume due to forced respiration falls rapidly after total pneumothorax and less rapidly after partial pneumothorax. Recovery of forced respiratory capacity is always slow. It is more rapid in early than in late life, but in the most favorable cases it never takes place as quickly as the return of normal respiratory capacity. This agrees with the clinical experience that persons with a pneumothorax need considerable time to regain a normal capacity for physical work.—*Recherches expérimentales sur la récupération de la capacité respiratoire chez les sujets traités par le pneumothorax artificiel, F. Dumarest and J. Delong, Rev. d. l. tuberc., 1921, ii, 99.*

Phototherapy of Ocular Tuberculosis.—Many workers have tried to measure the intensity of light derived from quartz lamps; some by biological methods, and others with dye reactions, layers of silver, colloidal solutions and selenium cells. It is necessary to remember that healthy tissues will absorb light differently from diseased tissues. Lamps will vary in their intensity in accordance with the life of the burner. To affect the deeper tissues, fluorescent substances can be used which change the short waves into long waves, or sensitizing substances which give to the long waves the chemical properties of short waves. On the eyes of rabbits Passow showed that after decreasing the distance between the lamp and the eye there was a uniform increase of the inflammation. With small doses one could obtain an inflammation and with large doses a necrosis. The voltage and amperage of the current and the period of raying, the distance, the age of the lamp and the type of lamp must all be measured. The author employed a Bach quartz lamp of 110 volts which had been used for one hundred to two hundred hours. After universal radiation employed in all forms of scrofula of the eye, the prognosis is best in children. The entire body is rayed every other day at a distance of 60 cm., beginning with five minutes, then ten, and after that fifteen minutes front and back. The eyes are only slightly closed. One hundred children were observed for over two years. In one-half of the children one to three rayings gave excellent results, and in the other half, four to six. Infiltrations were absorbed and ulcers healed. Rapid disappearance of the swelling and catarrhal discharge were noted. The eczema of the face was markedly bettered. In almost all cases the result was good. The younger the child and the shorter the disease, the better were the results. An indirect hematogenous action is probable. Similar favorable results by this method of treatment have been reported by Seefelder, Koppe, Augstein and Axmann. Indications for local raying are lupus of the lid, keratitis, tuberculous episcleritis, macula of the cornea, iritis and tuberculous iridocyclitis, choroido-

retinitis and tuberculous periphlebitis. In lupus of the lid the results are good when the eyes are rayed without protection but with the lids closed, and with the same doses as with general raying. In diseases of the cornea such as opacities, infiltrations and ulcers, the eye is rayed at a distance of from 60 to 100 cm., depending upon the stage of irritation of the eye. The duration of the first raying is always five minutes. The following lengths of exposure are determined by the reaction of the diseased tissues, but the period is generally ten minutes for the second dose. In general, one can usually rely on a raying of five minutes at a distance of 80 cm. as safe, and yet therapeutically helpful. With the left hand the lids are opened and with the right is held a large round shield containing an opening the size of the cornea, so that only the diseased area is rayed. If there is not too strong an irritation, no pain occurs. Animal experiments with a similar lamp on rabbits showed that at a distance of 40 cm. and with five minutes' exposure, ulceration of the cornea resulted. At 50 cm. and five to ten minutes raying, there were only epithelial changes which soon disappeared. At 60 cm. no harm resulted. Harm to the inner eye can be disregarded. Results in nodular types of opacity, corneal ulcerations and infiltrations of a probable tuberculous origin were best. Generally, after two or three exposures there was an increased hyperemia in the diseased area and a slight injection around it. Raying was resumed when the previous injection had disappeared. In disease of the inner eye results are not so promising. One cannot expect positive results in diseases of the iris and ciliary body. To protect the cornea from the action of large doses for inner eye disease, one can place a uviol glass or even ordinary window glass between the light and the eye. This will keep out the short ultraviolets and increase the amount of light. The lens absorbs the short rays from 310 $\mu\mu$ down and in many cases up to 375 $\mu\mu$. The longer rays probably reach to the retina. Koppe claims that he has healed many cases of tuberculosis of the inner eye by general radiation. It may also be true that with the proper fluorescence or sensitizing substances, the inner eye can be likewise affected by direct radiation. Finally, X-ray and radium on account of their harmful effects on the eye cannot be employed for tuberculous diseases of this organ.—*Beitrag zur Bewertung und praktischen Anwendung der Lichtbehandlung bei tuberkulösen Augenerkrankungen, A. Passow, Strahlentherapie, April 20, 1921, xii, 441.*

Results of Treatment of Lupus Vulgaris and Surgical Tuberculosis with Artificial Chemical Light Baths.—Reyn is opposed to the theory that the stronger the pigment the better the healing effect. With a carbon arc light he aims to obtain a marked erythema without pigmentation. The carbon arc is used for general radiations together with additional local exposures. The Finsen light gives much better results (up to ninety per cent) than raying with the quartz mercury light, but even here hundreds of radiations over prolonged periods are necessary. Ernst reports excellent success with light radiation in all forms of surgical tuberculosis, offering statistics to show better results with the carbon arc light than with the mercury quartz light.—*Die Resultate der Behandlung mit künstlichen chemische Lichtbadern bei Lupus Vulgaris und chirurgischer Tuberkulose, A. Reyn and N. Ernst, Strahlentherapie, January, 1920, x, 314.*

The Light Treatment of Venereal Diseases.—The bactericidal destroying properties of light play only a small part in the destruction of diseased tissues. The circulatory changes are much more important. It is essential that general applications of light should be made in additionto local ones. For local applications we must always radiate some healthy skin around the diseased area. There is evidence that the skin, as a protective organ, throws off antibodies. When one-third of the skin has been destroyed by severe burns, death results. Diseases like measles, scarlet fever, smallpox, typhus fever and syphilis, in which rashes appear, almost always confer an immunity after one attack. Trichophyton has been shown by Bloch to confer a distant healing action on other parts of the body when pieces of skin are injected or later transplanted. Protective antibodies are formed which produce this distant action. Inoculation of the skin with cowpox can protect against smallpox. Intracutaneous treatment seems to be more valuable in many cases than the subcutaneous treatment. In syphilis severe skin rashes are seen only in those cases that do not develop tertiary lesions later. If severe skin infection develops in the third stage of syphilis, then the inner organs generally remain free. Local radiation of furuncles may heal the infection but general radiations are necessary to prevent metastatic recurrences. Treatment for nearly twenty years has convinced the author of the great value of light radiations in the treatment of syphilis, with general radiations employed in any stage. Local exposures are also given when indicated. Gonorrhea has also been treated

with satisfactory results. Slight redness is the desired effect on the skin. Twenty minutes is the longest period of exposure employed. The specific treatment of syphilis is, of course, carried on in addition to the light exposures.—*Lichtbehandlung bei Geschlechtskrankheiten, nach 20 jahriger Erfahrung, S. Breiger, Münch. med. Wchnschr., August, 1920, no. 35, 1012.*

Light in the Treatment of Syphilis.—Syphilis in the tropics, although widespread, is generally of a milder character and tabes and paralyses are seldom seen. Under the action of light there is an increase of cells in the cutaneous basal layer and a hastening and strengthening of the cornification process. Under the action of light the skin assumes a series of properties that are most important for health. Inner secretions are given off by the skin; so that in this way light indirectly affects the diseased areas. The skin is richer in cells, gets better circulation, has better respiration and excretion, and regulates warmth and protects better. Syphilis, like tuberculosis, affects the skin and subcutaneous tissue, the lymph nodes, the inner organs and the nervous system. It has been noted that in patients with tabes and paralysis there was generally a failure of strong skin reactions, and those with strong general reactions and skin rashes very seldom developed tabes and paralysis. The patients treated by the author in no instance developed tabes and paralysis. Three patients who had been treated with sunlight, after three, five and eight years developed reinfections. Of course the light was used only as an aid to the mercury and salvarsan treatments.—*Die Rolle des Lichtes in der Luestherapie, E. Hesse, Strahlentherapie, April 20, 1921, xii, 461.*

Exposure of the Cornea to Ultraviolet Light.—Birch-Hirschfeld, after prolonged observations on animals undergoing exposure of the eye to ultraviolet rays, noted severe damage not only to the conjunctiva and cornea but also to the iris and retina. Since he applied rather large doses it seemed desirable to repeat the work. The author employed a Kromayer lamp in cylindrical form, so as to localize the rays over a small area of the cornea. The period was five to fifteen minutes. After a few hours there was a marked irritation of the conjunctiva, which gradually increased and after one and a half to two days gave a rawness to the superficial part of the cornea which was clearly demarcated from the normal tissue. The corneal clouding gradually receded to normal and on the fifteenth day had entirely cleared. No other inflammatory changes were evident in the eye. Microscopic examinations of the iris and lens, retina and ciliary bodies showed no changes. In another series of experiments in which the cornea was rayed for one hour, no irreparable damage was done. After fourteen days it was entirely clear. Therefore, in sluggish forms of keratitis there is no danger in using the light and good results are obtained. The painful irritation phenomena are best stopped with a 2 per cent cocaine salve and moist bandages soaked with trigeminon or pyramidon.—*Experimentelle und klinische Beiträge zur Bestrahlung der Kornea mit ultraviolettem Licht, T. Cholzen and E. Kuznitsky, Klin. Bl. f. Augenheilk, 1919, xl, 198.*

Ultraviolet Light Treatment of Heart and Vascular Diseases.—Ultraviolet rays lower blood pressure. Excellent reesults are obtained by a combination of quartz light raying and mineral baths. Irregularities, intermittencies and all nervous symptoms disappear quickly. The pulse is more regular, and softer and slower. Blood pressure is lowered and the patient sleeps better and feels better; diuresis is produced. Dilatation of the skin vessels offers less work for the heart.—*Ultravioletbestrahlungen als neue Grundlage der Therapie von Herz- und Gefässkrankheiten, Schäcker, Strahlentherapie, April 20, 1921, xii, 456.*

Sterilization of the Throats of Diphtheria Carriers with Ultraviolet Rays.—Over forty chronic nose and throat diphtheria carriers were treated by ultraviolet radiation with the Kromayer lamp. All parts of the tonsil are exposed directly for from three to five minutes, so that but one to three applications are necessary to completely cover each tonsil. The rays are applied through a hollow metal tube, one-half inch by six inches long, and so slanted to fit directly over the tonsil. In fifty per cent of the cases one treatment was enough to sterilize, while four cases required three exposures but none required more than that. If the cultures remained positive, the raying was repeated with a four to six minute exposure.—*Sterilization of Nose and Throat Diphtheria Carriers with Ultraviolet Rays, L. C. Donnelly, Michigan State Med. Soc. Jour., July, 1921, xx, 356.*

The Action of Ultraviolet Light on the Inner Organs of Eosin Sensitized Mice.—Eosin employed in amounts of 0.4 gm. per kilo body weight sensitizes mice and rabbits to light exposures. This amount was employed in one per cent solution for white mice. One to two hours

after the animals had been injected, they were exposed to ultraviolet radiation for one-half to one hour every day for about five successive days. Autopsies showed dilated vessels and hemorrhages, with round cell infiltration of the liver. Similar changes occurred in the spleen and kidneys, the latter also showing desquamated epithelium. In the lungs the capillaries were dilated and full of blood, while lymphoid cells filled the alveoli. Mice that were killed one and a half hours after injection of eosin showed red discoloration of the kidneys, liver, gall bladder and intestines. The results from about five hours of raying, in combination with eosin, were similar to those that were obtained by sixteen to eighteen hours of raying without eosin. The subcutaneous injection of eosin without the employment of light produced no changes in the deep organs except discoloration. The action of the rays did not depend upon the amount of injected eosin but upon efficient absorption. More marked changes were noted with daily raying than with raying every other day.—*Die Wirkung des ultravioletten Lichtes auf die inneren Organe mit Eosin sensibilisierter Mäuse, R. Gassul, Strahlentherapie, April, 1920. x, 1162.*

X-Ray Treatment of Tuberculosis.—Indications, technique and results are taken up in detail. The action is due to the stimulation of the connective tissue growth. Large amounts of granulation tissue form. Indurated lymph nodes give best promise. Caseous and pus foci are rarely influenced. The tubercle bacillus itself is not influenced by the rays. Weak and feverish patients must first become stronger and afebrile before treatment is given. Amyloid and contracted kidneys are contraindications. In the treatment of lymph nodes of the neck it is necessary to cover the larynx. Tuberculosis of the lymph nodes and the bones of the hands and feet and of the ribs and scapula, especially when the foci are closed, is easily influenced by X-rays. Caseous lymph nodes are best treated surgically at first and then given X-ray treatment. Fistulae should first be freed from necrotic tissue, and cold abscesses should first be punctured and later rayed. Lupus vulgaris should be treated by the Finsen method. Disease of the larger bones and joints is only gradually healed with the X-ray. The treatment has not given good results in disease of the peritoneum, genitourinary tract, uterus, ovaries and the gastrointestinal tract. In pulmonary tuberculosis, only the indurative types when they approach latency or are slowly progressive prove suitable.—*Die Behandlung der Tuberkulose mit Röntgenstrahlen, E. Mühlmann, Therap. Halbmonatsh., 1920, ii, 35.*

X-ray Treatment of Tuberculous Lymph Nodes.—This therapy surpasses sunlight because of its more accurate dosage, greater ease of employment, ability to be used at any time, quicker results and fewer residua. In anemic and weak patients, it is employed in connection with the ultraviolet light. The virulence of tubercle bacilli is diminished. A dose strong enough to kill bacteria is, however, too large and is liable to burn the skin, but the resulting proliferation of connective tissue works against the growth of bacteria. Besides having a local action X-ray treatment also increases general resistance. Secondarily infected nodes are much more difficult to heal.—*Röntgentherapie der tuberkulösen Lymphdrüsen, S. Simic, Srpski Archiv., 1920, i, 33.*

Action of Radium and Roentgen Rays on Normal and Diseased Lymphoid Tissue.—Circulating lymphocytes are most readily influenced by radium and roentgen rays, while the other normal types of leucocytes and red blood cells possess greater resistance. Normal lymphoid tissue is comparatively less sensitive to the rays than the various types of diseased lymphoid tissue. Hodgkin's disease and lymphosarcoma are particularly susceptible to radiation. Myeloid leukemia is especially susceptible to radium and roentgen rays, but myelocytes in conditions other than these are not sensitive. Radiation of the spleen influences considerably the course of various diseases of the blood and lymphoid tissue. In two cases of pernicious anemia it caused a marked shrinkage of the enlarged spleen. The action of the radiation is not merely a local one, but there is a generalized effect on the lymphoid system of the whole body. It may be that specific enzymes are freed from the degenerating lymphocytes. The bone marrow and other depots of diseased tissue may replace the destroyed lymphocytes with the leucocytes. When the animal receives a larger amount of radiation, the total white cell count may go as low as six hundred.—*Action of Radium and Roentgen Rays on Normal and Diseased Lymphoid Tissues, I. Levin, Jour. Amer. Med. Assoc., September, 1921, lxxvii, 930.*

Surgical Treatment of Tuberculosis.—König criticizes the conservative methods outlined by Bier in a previous number of this journal. He inquires what these conservative measures have accomplished, that they should be so broadly recommended to the practitioner, and then proceeds to analyze in detail the various surgical conditions and their treatment. In tuberculous cervical adenitis operative interference is to be avoided, if possible, because of the

disfiguring scars; treatment by heliotherapy or X-rays is preferable. In certain cases of bone and joint tuberculosis, heliotherapy has undoubtedly given good results, but it very frequently fails. Although comparative statistics of cases treated by operation alone and those handled by conservative measures are wanting, he has collected from the literature 1932 cases of resections for tuberculosis of bones and joints, 68 per cent of which showed permanent healing. The opposition is defied to produce like figures. Extraärticular tuberculous foci in the bones demand operative interference because of the greater certainity of the results, and because less time is required for their cure. In cases of progressive destructive articular lesions resection is imperative. If the practitioner would follow Bier's advice he must experiment upon his patients, and although experiment upon human beings may be necessary, it may be very unfortunate for the patient and should be avoided. He concludes with a plea against slavishly following the conservative advice of Bier and that the practitioner make use of operative procedures as these may be indicated.—*F. König.*

Immediately following is a reply by Bier.—He suggests that although a general infirmary is not the place to treat all sorts of tuberculosis, yet if physicians working in such institutions would follow his simple conservative procedures, the patients would be bettered. In reply to König's accusation that he is experimenting upon human beings, he remarks that König is in error, for heliotherapy has demonstrated its worth for twenty years and has passed the experimental stage. He presents no statistics, but states that his cases of "healing" are ones in which a limb is restored to function as opposed to the "healing" after amputation or resection of a joint. Isolated extraärticular foci are rare, and if present do not require resection in his mode of treatment. Often chronic fistulae respond more readily to the light treatment than do the early cases. He concludes by advising all physicians who wish to treat surgical tuberculosis to resort to heliotherapy first.—*Die Behandlung der chirugischen Tuberkulose, F. König, and Bemerkung zu vorstehendem Aufsatz, A. Bier, Münch. med. Wchnschr., May 27, 1921, lxviii, 642.*

Surgical Treatment of Tuberculosis.—Previous to the discovery of the tubercle bacillus, tuberculosis was thought to be a diathesis in which the humors of the body had suffered some disturbance. To correct this disturbance codliver oil and iodine treatments, together with climatic treatment, were in vogue. Surgical treatment was confined to corrective measures applied after the healing of the disease process. Koch's discovery led to attempts at the application of all sorts of antiseptics to the apices of the lungs. Operative removal of tuberculous foci led to rapid dissemination of disease, and the zest for radical operations also led surgeons to disregard the epiphyseal lines, with the result that interference with growth and shortened limbs were frequent occurrences. It followed that the surgery of tuberculosis fell into disrepute. Of fundamental importance in the surgical treatment of this disease is the recognition that it is a generalized disease, the local manifestations of which may call for surgical treatment. General measures have their proper place but are in no sense specific. They probably act by stimulating metabolic activities. Other more specific measures are the injection of iodoform-glycerine and X-ray treatment. The former has no direct germicidal action, but when brought into contact with protein decomposition products it exerts a positive chemotactic influence upon the leucocytes which liberate proteolytic ferments, that break down the hard caseous exudate and promote its absorption. Iodoform-glycerine is useful in the treatment of cold abscesses and fistulae. Depending upon the size of the abscess, from 10 to 30 cc. of a 10 per cent iodoform-glycerine solution is injected, and these injections are repeated at "properly spaced intervals." The X-ray is employed in one-fourth to one-third maximal doses with zinc filters, 0.5 to 0.7 mm. in thickness; the raying is repeated once a month over a period of three or four months. Closed lymph node tuberculosis offers the best type of lesion for this mode of treatment, but marked improvement has been noted in open and closed bone and joint cases, in lesions of the "soft parts", epididymis, and in open lymph node tuberculosis. By combination with sunlight treatment, a further stimulus is added which seems to promote a more rapid fibrosis. The Deycke-Much partial antigens have some value, but the author's experience with them is limited. He has not seen Friedmann's cure employed to the exclusion of other measures, and he has had no experience with tuberculin. Bier's massive hyperemia is probably useful in some joint cases, but it is difficult to judge its value, as it is most often combined with immobilization of affected joints. For this purpose plaster of Paris is preferable to extension apparatus, as children may be sent away for climatic treatment. Joints are rayed with sunlight

or the X-rays through windows cut in the plaster. Effusions are treated by the injection of iodoform-glycerine. Isolated tuberculous foci in small bones may be removed without danger. With marked destruction of a joint, resection is indicated. It is a fact that when tuberculosis of an extremity coexists with pulmonary tuberculosis on the same side, amputation of the affected limb will very often cause radical improvement of the lung condition. For tuberculosis of the spine absolute fixation followed by removal of diseased portions is the method of choice. Albee's operation of grafting a portion of the tibia into the spine is useful in some cases. Tuberculous peritonitis should be treated by the above mentioned constitutional methods or occasionally through a laparotomy incision; the peritoneum is swabbed out with tincture of iodine. Resection of a tuberculous cecum will often lead to the spontaneous healing of tuberculous ulcers in other parts of the intestine. If ulceration leads to stenosis, anastomoses are indicated. The use of the X-ray has proved especially valuable in the treatment of tuberculosis of the epididymis. Renal tuberculosis which does not tend to spontaneous healing is treated by excision. An early diagnosis is of great importance. In the surgical treatment of pulmonary tuberculosis artificial pneumothorax is the simplest procedure. The Friedreich thoracotomy, done where extensive pleura adhesions prevented collapse of the lung, gave too great an operative mortality. Sauerbruch's paravertebral resection of the ribs from the eleventh to the first, done in several sittings under local anesthesia, when combined with artificial pneumothorax gives the best results. Wilm's columnar resection gives only a partial compression. Extrapleural pneumolysis, resection of ribs, stripping off the parietal pleura and packing the space with paraffin have likewise been used. Phrenicotomy, to limit the movement of the diaphragm, has been used as an adjunct to these operations. The phrenic nerve can be readily severed in the neck under local anesthesia. Most important of all in surgery of pulmonary tuberculosis is the choice of cases. Only unilateral disease is suitable, and the most favorable cases are those with extensive fibrosis and cavity formation.—*Die Behandlung chirurgischer Tuberkulosen, R. Haecker, Münch. med. Wchnschr., January 7, 1921, lxviii, 18.*

Surgery in Pulmonary Tuberculosis.—It is possible by operative procedures to so favorably influence a severe, and particularly a unilateral, pulmonary tuberculosis, that a marked improvement or even complete healing is brought about. Not all cases are suitable for this mode of treatment, however, and such treatment can only be successfully carried out after careful observation by a competent clinician in conjunction with the surgeon. The ideal case for artificial pneumothorax treatment is one in which the disease is confined to an upper lobe which is free from adhesions. Where, because of such adhesions, it becomes impossible to compress the lung by the ordinary method, resection of several ribs and extrapleural compression are recommended. The resections are done in the paravertebral line, allowing compression of the lateral and anterior portions of the thorax. The number of ribs resected must be governed by the extent of the disease. Where the whole lung is covered by adherent pleura, the ribs from the eleventh to the first must be cut, but if there are adhesions over the upper lobe only, the overlying ribs are resected while the lower lobe is compressed by artificial pneumothorax. In cases where the pleura is completely adherent, the lower lobe should always be compressed first, and the upper not touched until a later date, when the lower lobe is completely compressed. The primary mortality from the operation in Sauerbruch's clinic has been 2 per cent. To this is added a delayed mortality of 12 per cent due to fatal progressive involvement of the opposite lung, to aspiration pneumonias, and to faulty selection of cases for operation. It is possible to employ the intrapleural pneumolysis of Jacobaeus in cases where small bandlike adhesions interfere with the compression. This method consists in the inspection of the interior of the pleural cavity by a thorascope and the section of the obstruction by a small electrocautery. Because such adhesions frequently contain vessels which may cause severe hemorrhage or bronchi which may cause infection of the pleural cavity, Sauerbruch opposes its use. If, after attempting to compress the upper lobe by rib resection the lung is still expanded, extrapleural pneumolysis may be tried. This consists in exposing the pleura and tamponing the lung. Frequently, a lung containing a large cavity may be completely collapsed in from eight to ten days by this method. Large, badly infected cavities may be drained through the chest wall at various points, depending upon their location. The resulting lung fistula must be closed at a later date (after two or three months) by a plastic operation. Sauerbruch uses phrenicotomy or section of the phrenic nerve, as a diagnostic rather than a therapeutic measure. The cases reported as cured have been under observation for eight or

ten years, and, while not denying that even cavities may heal spontaneously, he feels that his surgical interference has been justified. Up to 1919 he has so treated 381 tuberculous cases, of which 134, or 35 per cent, were "practically healed." Forty per cent were improved. He concludes with a plea for operative treatment alone or combined with artificial pneumothorax, as a means of closing bacilli-laden cavities and thus removing a great source of infection to individuals in the immediate vicinity of the patient.—*Die chirurgische Behandlung der Lungentuberkulose, F. Sauerbruch, Münch. med. Wchnschr., March 4, 1921, lxviii, 261.*

Treatment of Surgical Tuberculosis by the Practitioner.—The increased amount of tuberculosis among the German people since the war has compelled the ordinary practitioner of medicine to treat many cases of surgical tuberculosis himself. Bier recommends that he refrain from attempting to experiment with radical surgical procedures, but that he be content with more conservative measures. In fact, he himself has found operation rarely necessary in such conditions. The chief method of nonoperative treatment is heliotherapy as applied by Bernhard and Rollier. On cloudy days, if the cost is not prohibitive, artificial ultraviolet lamps may be substituted. Bier himself recommends the apparatus of Kisch made by Zeiss. This is of advantage because in addition to the ultraviolet rays it also gives off heat rays and maintains a temperature of about 70°C. Treatment by X-rays is also valuable in lymph node tuberculosis but its use requires considerable technical knowledge. The second method is passive hyperemia, which the unskilled should attempt only on the head and extremities. Bandages (rubber) should be applied with greatest care, and it is of first importance that no pain or discomfort should be experienced by the patient. The third measure is internal medication with sodium iodide, given in daily doses, 3.25 gm. for adults, 1 gm. for adolescents, and 0.5 gm. for children under five years. No ill effects have been observed. This treatment brings about resorption of pus in cold abscesses and of sequestra in bones. Fixation of tuberculous joints should never be practised. Bed rest is quite sufficient for the treatment of tuberculosis of the legs, pelvis and spine; for the upper extremities loose bandaging is employed. Such treatment causes disappearance of pain in a short while and allows sufficient movement of the affected joints. Motion which causes pain should be avoided. Cold abscesses should be aspirated, not with a trocar, but with a small needle. If such aspiration is repeated often enough the abscess will heal without fistula formation. With such methods the ordinary practitioner can successfully treat all cases of lymph node and skin tuberculosis, and all tuberculous lesions of bones and joints which have not advanced to extensive tissue destruction and deformity. The treatment of the last group should be reserved for those skilled in the handling of orthopedic appliances. In his sanatorium at Hohenlychen, Bier treats all classes of cases, many of which have progressed to amyloid changes, and yet by these methods there are 70 per cent of cures. Only 3.5 per cent died, either from tuberculous meningitis, amyloid disease or other causes. The severe cases may require ten months' treatment, but persistence will be rewarded.—*Die Behandlung der sogenannten chirurgischen Tuberkulose durch den praktischen Ärzt, A. Bier, Münch. med. Wchnschr., February 25, 1921, lxviii, 243.*

Treatment of Surgical Tuberculosis with Turtle Bacilli.—Patients are being given subcutaneous or intramuscular injections of living turtle tubercle bacilli. Fistulae are treated by direct application into the tract. The dose is from 0.25 to 0.3 cc. of a homogeneous suspension of the germs. The concentration of the suspension is not of great moment, as the bacilli are avirulent and nontoxic. The intramuscular injections are made into the gluteal or deltoid muscles. If the hard nodules arising at the site of injection become softened, raying with direct sunlight or roentgen ray (with a 2 mm. aluminum filter) soon restores them to their previous hard condition. With three exceptions, all cases so far treated have been ambulant. No ill effects have been noted, with the occasional exception of a slight temporary rise in temperature. The result, especially in children, is a prompt "fixation of toxin" manifested by a disappearance of night sweats, an increase in appetite, an increase in weight and prompt improvement of general appearance. It is alleged that the cold-blooded tubercle bacillus vaccine is a specific for tuberculosis and scrofulosis. The prognosis is better the earlier treatment is commenced.—*Über die Behandlung der chirurgischen Tuberkulose mit Ktb Vakzine, Brandenstein, Münch. med. Wchnschr, July 2, 1920, lxvii, 786.*

Surgical Treatment of Tuberculosis of the Spine.—The Albee operation consists in transplanting a portion of tibia to replace the spinous processes of diseased vertebrae.

Over 100 cases have been so treated, but this report deals with only 60, operated upon from September, 1913, to August, 1918. All cases of unhealed tuberculosis of the spine were subjected to this treatment; the only contraindications being the contamination of the operative field by fistulae or wounds, the occurrence of paralyses or the generally poor condition of the patient. The ages of the cases varied from one to forty-eight years, but the larger number (44) were ten years or under. A questionnaire was sent out at the end of 1919 to all operated patients. Only fifty-seven cases could be considered, as two had died within a year after the operation, and in one the graft had not taken. All but eight of these were traced. Of the 49 remaining, 42 showed apparent and 26 permanent healing. Such bone implantation is a procedure without serious technical difficulties which offers the patient early and permanent healing. If deformity has not already been established it is prevented; if kyphosis exists its further development is arrested. No interference with movement of the body is experienced.—*Über unsere Erfolge mit der Albeeschen Operation in 60 Fallen von Wirbelsäulentuberkulose, Görres, Münch. med. Wchnschr., July 30, 1920, lxvii, 896.*

Care of Tuberculous Cripples.—Essential points in the care of tuberculous cripples are (1) the child should be brought under treatment as early as possible, (2) treatment should be prolonged for a sufficient length of time to obtain the best cure, (3) after-care must be provided to guard against relapse, a provision most readily effected by arrangement with the School Medical Officer, and (4) suitable educational provision must be provided to stimulate recovery and prevent mental stagnation. As a result of his experience the author made the following suggestions: 1. The introduction of special teaching in the medical schools and facilities for post-graduate study. 2. The inauguration of a diploma in tuberculosis in order that specially trained officers may be available for the work. 3. The centralization of the work for nonpulmonary tuberculosis under one head, namely, the Medical Officer of Health and his Surgical Tuberculosis Officer, as against the multiplication of responsibilities which now exists. 4. The treatment of these cases in special hospital schools and residential open-air schools, as against their reception into the wards of the general hospitals and the convalescent homes. 5. The establishing of after-care clinics and the necessary machinery for following up cases which have undergone treatment, in order that the results obtained from the treatment of this disease may be most effectively checked up.—*The Care of Tuberculous Cripples: A Proposed Scheme, T. H. Martin, Brit. J. Tuberc., July, 1921, xv, 112.*

Extrapleural Thoracotomy.—The following is a report of the only case of extrapleural thoracoplasty done at the Massachusetts General Hospital: A man, aged thirty-four, was referred to the hospital July 28, 1920. He gave a history of eight years' duration. Twelve weeks before entering the hospital he became acutely ill with cough, sputum, night sweats, poor appetite and rapid loss of weight. He presented all the clinical signs of advanced pulmonary tuberculosis on the right side, with no signs of involvement on the left. These findings were confirmed by X-ray examination. The operation was performed August 3, 1920, after the method of Paulsen and Saugman. The patient was comfortably placed on the operating table, with a pillow under his chest. His right arm was extended over his head and the right side of his chest came exactly at the edge of the table. Preoperative medication was as follows: 1.40 P.M., morphine sulphate gr. $\frac{1}{4}$; 2.10 P.M., morphine sulphate gr. $\frac{1}{3}$; 4.10 P.M., morphine sulphate gr. $\frac{1}{3}$. Regional and mass infiltration local anesthesia was used with 1 per cent and 0.5 per cent novocaine-adrenalin. An attempt was made first to block each intercostal nerve by introducing 5 cc. of the 1 per cent solution in the sulcus intercostalis at the neck of each rib. Then mass infiltration of the region of the incision was done, in which 100 cc. of the 1 per cent and 60 cc. of the one-half per cent solutions were used. The incision extended parallel to and about 3 cm. from the spine, then laterally along the tenth rib. The incision was painlessly made and the scapula retracted outward, giving a good exposure of the ribs. While the assistant controlled the bleeding, the operator, under direct vision, placed more 1 per cent novocaine into each intercostal nerve at the rib angles. Subperiosteal resection of sections of the upper 11 ribs, beginning at the eleventh and working upward, was now done. The ribs were sectioned posteriorly as near the transverse processes as possible, but the operator did not think it important to carry the anterior section too near the sternum. The first rib was so difficult to reach through this incision that only a small section of it could be removed. The sections of ribs removed measured from 2 to 11.5 cm. After the rib resection was completed, the parietal pleura was freed forward and backward from the chest wall, care being taken not to open

the pleural cavity. All bleeding was stopped and the muscles sutured. The wound was drained with one rubber dam wick at its lower end. A thick gauze dressing was held in position by adhesive and an especially made chest belt applied at once to compress the right lung. The duration of the operation was an hour and thirty-three minutes. The patient talked throughout the operation and declared he felt no pain. On the fifth day the drain was removed and the wound healed by first intention. The patient left the hospital October 13, 1920, and entered the Cambridge City Tuberculosis Sanatorium at Belmont. The number of tubercle bacilli in the sputum was greatly diminished and the amount of sputum was 45 cc. in twenty-four hours, as compared with 210 cc. on entering the hosptial. The patient gained steadily in weight and in February, 1921, felt so well that he insisted on leaving the sanatorium and returning to work. He began to lose weight almost immediately and in March had two attacks of hemoptysis. In April, 1921, he began hygienic treatment at home, under direction of his physician, and is reported to be rapidly improving again. It now seems assured that the marked improvement shown after operation will result in definite improvement if the hygienic treatment be continued for a sufficiently long time.—*Extra Pleural Thoracotomy for Advanced Unilateral Pulmonary Tuberculosis. Report of a Case, W. Whittemore and G. L. Chaffin, Boston M. & S. J., September 1, 1921, clxxxv, 249.*

Cold-Blooded Tubercle Bacilli and Freidmann's Vaccine.—Moeller administered acid-fast bacteria for the immunization and treatment of tuberculosis before Friedmann. His results as well as those of French investigators were negative. The turtle bacillus is not a cold-blooded type but is a harmless saprophyte. The blindworm bacillus is more closely related to the tubercle bacillus than is the turtle bacillus. Truly virulent human tubercle bacilli can produce immunity to tuberculosis when the initial doses are minimal. Serums of tuberculous patients give the same reaction with grass and turtle bacilli but a much stronger reaction with tubercle bacilli. Serums of rabbits treated with grass or turtle bacilli reveal no difference in the reactions to these two types of bacilli. Furthermore, the grass and turtle bacilli were found to belong to the same variety when using Much's experiment of immunization with "Neurin tubercle bacilli" and by agglutination. By Much's affinity test the grass bacillus was found more closely related to the tubercle bacillus than was the turtle bacillus. Turtle bacilli have no antagonistic relation to tubercle bacilli, as determined by their luxuriant growth on mediums exhausted by the growth of turtle bacilli. Friedmann's bacillus is a saprophyte, grows rapidly, does not adapt itself to the hosts' temperature, does not produce disease after subcutaneous injection, does not multiply in the body and shows no tendency to disseminate. Friedmann's contention that the turtle bacillus produces tuberculosis in cold blooded animals is not verified by Moeller's experiments. The antibodies toward tubercle bacilli are an inseparable unit and can only be produced by living genuine tubercle bacilli; tubercle bacillus emulsions, tuberculins and partial antigens give rise to only a fraction of the antibodies. Immunization with grass or turtle bacilli is impossible, since they lack the pathogenic qualities of tubercle bacilli. Complement binding bodies and agglutinins are not tuberculosis-immune substances but may act merely as a measure for their production. Highly virulent human tubercle bacilli, given intravenously to guinea pigs in a number less than 4 to 5 are soon killed, and produce antibodies. In nine months the animals are accustomed to a thousand times a fatal dose. In two cases highly virulent bacilli were given to patients intravenously without harmful effect. In order to show that turtle bacilli have no antigens homologous to the tubercle bacilli, 30 million turtle bacilli were injected into guinea pigs which were subsequently infected with a small dose of human bacilli. The animals died after six weeks from miliary tuberculosis, as did also guinea pigs not previously treated with turtle bacilli.—*Meine Kaltblütertuberkelbazillen und das Friedmann'sche Mittel, A. Moeller, Berl. klin. Wchnschr., January 24, 1921, lviii, 78.*

The Specificity of Friedmann's Vaccine.—Experimental research has demonstrated that it is not possible to immunize an animal against tuberculosis by the use of Friedmann's turtle bacillus, and that a tuberculous animal cannot be cured of its disease by this means. The clinician must have the last word in the settlement of this question. While it has been conclusively demonstrated that this organism is a saprophyte and in no sense a tubercle bacillus, yet it seems plausible that it may have some value in the treatment of tuberculosis. Antigens other than the tubercle bacillus, such as turpentine, sugar and salt have been used for the stimulation of antibodies in tuberculosis. Is it not possible that the turtle bacillus may play a similar rôle? It has been shown that these bacilli can

survive and even multiply in the body for weeks and even months at a time; at the same time many of the germs are being killed. A nodule is formed, so that the pathological condition simulates that of a true tubercle with a persistent source for antibody production. Thus it would seem that the Friedmann bacillus establishes a focus for the continued elaboration of nonspecific antibodies. It remains to be proved whether other nonpathogenic acid-fasts have a like faculty, and whether other chronic infections are influenced by the turtle bacillus.—*Ist die Behandlung der Tuberkulose nach Friedmann eine spezifische? Rietschel, Münch. med. Wchnschr., April 15, 1921, lxviii, 450.*

Treatment of Lupus Vulgaris with Friedmann's Vaccine.—Friedmann's vaccine was administered in 2 cases of tuberculous epididymitis and in 16 of lupus vulgaris. Some of these cases were associated with scrofuloderma, and bone and joint tuberculosis. A remarkable improvement in the scrofuloderma, epididymitis, joint, and bone conditions were obtained; but the lupus vulgaris either was distinctly aggravated or was not influenced. A difference in the reaction occasioned by Koch's tuberculin and Friedmann's vaccine was noted. The former either produced a diffuse inflammation or swelling and reddening, 1 cm. away from the involved skin, while the latter induced the same changes in the peripheral part of the foci.—*Über die Behandlung des Lupus vulgaris mit dem Friedmannschen Mittel, A. Bushke, Berl. klin. Wchnschr., January 3, 1921, lviii, 3.*

Surgical Tuberculosis Treated by the Friedmann Vaccine.—Fifty-two cases were treated by this method during 1914. The age ranged from one and a half to sixty-nine years, 30 of the cases being under ten years old. The lesions were in bones, joints, lymph nodes, skin and genitourinary system. In 14 this method was exclusively employed; in the rest it was combined with surgical procedures. Injections were made into the gluteal muscles, sometimes repeated once a week or more. A year later 7 of these cases were completely healed, 30 showed temporary improvement, 13 were unimproved and 1 died. Five or six years later 47 of these cases were again followed up. Nine had died, 6 of tuberculosis, and of these 3 died within a month after their discharge. Two died from causes other than tuberculosis. Six patients, although improved, failed to show complete healing. Thirty-two showed no trace of tuberculosis after five or six years. The complete history of one patient with a tuberculous peritonsillar abscess, who responded to the treatment with healing, is given. A case of coxitis, which was treated, relapsed after three months, was again treated and showed marked improvement and absolute freedom from pain. A third case with genitourinary tuberculosis is followed in which the improvement was interfered with by a smallpox vaccination.—*Die Behandlung chirurgischer Tuberkulosen mit der Friedmannschen Mittel und ihre Ergebnisse nach 6 Jahren, F. Krumm, Münch. med. Wchnschr., July 23, 1921, lxvii, 870.*

Inhibition of the Tuberculin Reaction by Serums, Transudates and Exudates.—Transudates, exudates and blood serums, mixed with tuberculin, prevent or weaken the reaction occurring after Pirquet test or subcutaneous injection. This effect is not due to antituberculin but to a colloidal inhibition, being a physical and not a biological phenomenon. The fluids from cases of tuberculosis, carcinoma, acute pneumonia and hydrops, and solutions of casein and colloidal iron all had the same effect. Glucose, however, had no such effect. Charcoal had been previously found to act like the colloids.—*Die Behinderung der Tuberkulinreaktion durch Serums, Transudat und Exudat, L. Dünner and A. Horovitz, Berl. klin. Wchnschr., June, 20, 1921, lviii, 665.*

Therapeutic Value of the Ponndorf Tuberculin Treatment in Pulmonary Tuberculosis.—Ponndorf's technique was not strictly adhered to, in that primarily only two or three small cuts barely deep enough to cause bleeding, were made in the skin of the upper arm previously and a small drop of undiluted tuberculin (O. T.) was well rubbed into the abrasions. At the same time, guided by the skin reaction and the general or local inflammatory reaction, the second vaccination administered after three or four weeks was performed on the other arm through from six to ten cuts about 3 cm. long. Subsequent inoculations were made, differing in the individul cases, usually after an interval of four to six weeks, but always in a new portion of the upper arm: more than two drops of tuberculin in one vaccination site of ten cuts was never used. A preliminary Pirquet test was found advantageous in determining the skin reactivity, which was an index of the allergic immunity. If this proved negative in an advanced case with active clinical findings, active immunization was not feasible. Thirty cases of moderate tuberculosis were treated: 5 were Turban I, 18 Turban II and 7 Turban III;

27 with bacilli in the sputum; and four with tuberculous laryngitis. Of these 30 cases, 11 were markedly benefited, 8 definitely benefited, 8 uninfluenced, 2 permanently harmed by the first vaccination and 1 temporarily harmed by the treatment, so that it was discontinued in these latter three cases. Of the 27 open cases, 9 became rid of bacilli in the sputum. The best results were obtained in the milder cases in the first and second stages, but good results were also obtained in third stage cases. Compared to the ordinary injection methods the cutaneous vaccination (*Kutanimpfung*) had the advantage that marked tuberculin reactions with fever and inflammation occurred less frequently and were milder. Individual cases varied as to the duration of treatment necessary but the average duration was about four months. In certain cases the therapeutic effect was enhanced by concident intravenous calcium chloride injections. The Ponndorf method of cutaneous vaccination is recommended in all cases suitable for active immunization with O. T. The relation between the skin reaction and final success of treatment proved enlightening; of the 24 cases with a moderate or marked skin reaction, 19 yielded good results and of 6 with a weak or negative reaction, 3 were uninfluenced by the treatment and 3 became worse.—*Über den therapeutischen Wert der Ponndorfschen Tuberkulinhautimpfung bei Lungentuberkulose, Leichtweiss, Beitr. z. Klin. d. Tuberk., March 1921, xlvii, 37.*

Tuberculin in the Treatment of Pleurisy with Effusion.—It is questionable whether repeated thoracentesis does not effect more harm than good, for it has been shown that pleural effusions contain antibodies; and by withdrawal of the fluid the body is deprived of the defensive mechanism which it has elaborated. The use of tuberculin increases the number of these antibodies, and the dangers of thoracentesis are avoided. A case is cited with details of the treatment. The patient was having fever and had fluid to the level of the middle of the scapula. Oliguria was a marked feature. After six weeks of treatment the man was able to return to work, free from signs and symptoms. At the outset the daily urine output was 700 or 800 cc; a subcutaneous dose of 0.0002 mgm. of old tuberculin was administered and the next day the urine rose to 1100 cc. Tuberculin was repeated every third day in the following doses: 0.0003, 0.0005, 0.001, 0.005, 0.01, 0.03, 0.06, 0.06, 0.08, 0.2, 0.3, 0.5, and 0.4 mgm. After the twelfth injection of 0.3 mgm. the daily void had reached 2370 cc. The temperature at first ranged between 38° and 39.1°C., but after four injections it dropped to 37.5° and after the ninth injection remained below 37°. The fluid in the chest showed a steady decrease; the patient's symptoms disappeared; and on the day following the eleventh injection he became ambulant. In commenting on the use of such treatment, Stuhl cautions against the employment of too large doses at the start; tuberculin has a strong diuretic effect and it is possible that the fluid in the chest may be removed too rapidly if a dose as large as 0.02 mgm. should be used at the outset. He also mentions that tuberculin offers a means of differential diagnosis as between tuberculous pleurisy with effusion and rheumatic pleurisy. By its use time is saved, the patient is getting proper treatment if the former condition is present, and the necessity of uncertain laboratory tests, not always available, is obviated.—*Weiter Beitrag zur Tuberkulinbehandlung der Pleuritis exudativa tuberculosa, C. Stuhl, Münch. med. Wchnschr., April 29, 1921, lxviii, 514.*

The Leucocytes during the Treatment of Tuberculosis with the Deycke-Much Partial Antigens.—A definite leucocytosis in tuberculosis, except in the severe cases, occurs after the administration of minimal doses of partigens, without a coincidence rise in temperature. This behavior of the total leucocytes was found to be of no prognostic value. The partigens produced a definite lymphocytosis, but this also proved of no prognostic or therapeutic significance in man. Eosinophiles responded variably. If the injections were well tolerated and the case ran a favorable clinical course, they would increase after every injection and would remain thus. In clinically doubtful or unfavorable cases there resulted either no increase or, after a transient rise, a distinct diminution in number. If no reaction occurred and the eosinophiles would diminish, the case was unsuitable for partigen therapy. The reaction of the eosinophiles is, therefore, of prognostic value and can be used as a gauge in therapy.—*Über das Verhalten des Blutbildes, speziell der eosinophilen Leukozyten bei der Tuberkulosebehandlung mit Deycke-Muchschen Partialantigenen, F. Luithlen, Beitr. z. klin. f. Tuberk., March, 15, 1921, xlvii, 20.*

Treatment of Tuberculosis with Partial Antigens (Deycke-Much).—The treatment was tried on 156 cases which had previously been under observation for several weeks. One hundred and forty-six were uncomplicated pulmonary cases; 10 showed bone and gland lesions only. The former

were classified clinically as cirrhotic, cirrhotic-nodular, nodular, or nodular-pneumonic types. Eight days before commencing treatment, all patients were given intracutaneous tests with the several antigens, M Tb R, A, F and N; these were repeated two or three weeks before the end of the treatment. Twenty-five patients were treated with the partial antigens, A, F, and N only, while the remainder received M Tb R only. In a first small group of ten the initial dose was determined by the reaction to the intracutaneous test; the second group was likewise started in this manner, but later the highest dilution (0.1 cc. = 0.000,001 mgm.) was employed. The average duration of treatment was five or six months. Most of the cases were kept at rest and all were given the usual dietetic and fresh air treatment. The authors conclude that the treatment is only beneficial as an adjunct to the usual dietetic and hygienic measures in incipient cases; and that even in these it is in no way superior to the ordinary tuberculins. They add that no ill effects have been observed. For diagnostic purposes little insight is gained as to the action of the defensive mechanisms of the body.—*Erfahrungen über die Partialantigenen (Deycke-Much), L. Jacob und M. Blechschmidt, Münch med. Wchnschr., April 1, 1920, lxvii, 447.*

Influence of Organ Extracts on Tubercle Bacilli.—Tubercle bacilli, treated from three to five days with ox or guinea pig lymph node extract or press-juice, were less virulent for guinea pigs than tubercle bacilli in saline suspension. Pancreas and kidney tissue had a similar effect, while the action of muscle juice was negative. Suspension in pleural and ascitic fluids appeared to have no effect on virulence. No delay in the tuberculous process of an infected animal was caused by injection of any of the organ extracts which lowered virulence.—*Experimentelle Untersuchungen über die Einwirkung von Organen, Organextracten, Exsudaten und Sekreten auf Tuberkelbacillen im Reagenzglase und entsprechende Heil- und Immunisierungsversuche gegen die Tuberkulose der Haustiere, C. Giese, Zeitschr. f. Immunitätsforsch. u. exper. Therap., June 4, 1921, xxxi, 533.*

Tebelon in the Treatment of Surgical Tuberculosis.—Tebelon is a proprietary preparation consisting of the isobutyl esters of fatty acids from the tubercle bacillus. Stoeltzner, who isolated the substance, believes that it stimulates the production of antibodies against the waxes of the tubercle bacillus. The results on 19 cases are reported, including bone, joint, gland and skin lesions. Complete healing occurred in 10, within one and a half to three months. Not only were fistulae closed, but by X-ray there was evidence of regeneration about areas of osteosclerosis. Five cases were improved, while in 4 the condition remained the same. The usual surgical and orthopedic measures were continued during the tebelon treatment. Cases showing a positive Pirquet reaction before treatment showed none after its completion. One cubic centimetre was injected subcutaneously into the back every third day. No ill effects attended its use. The author is at a loss to explain the lack of fever if antibodies are formed which are capable of dissolving the capsule of the bacillus.—*Tebelon in der Behandlung der chirurgischen Tuberkulose, W. Baensch, Münch. med. Wchnschr., August 27, 1920, lxvii, 1009.*

Tubar, another Tuberculosis Vaccine.—Koch has established the fact that there is an immunity to tuberculosis, and that for the production of such immunity the intact tubercle bacilli cannot be employed. Deycke and Much have further shown that the water soluble fever-producing elements in the tubercle bacillus (proteins), the chief components of Koch's tuberculin, are not sufficient to accomplish this purpose, but on the other hand that on the removal of these fever-producing substances the establishment of immunity is disturbed. These doctrines were scientifically supported by serological data showing that "partial antigens" would stimulate the production of "partial antibodies," and further, that there existed in the skin a "partial susceptibility" to "partial toxins." Because of the necessity of employing three separate antigens and because of some adverse criticism of the new methods, many physicians have hesitated to adopt the Deycke-Much method; nevertheless the antigenic qualities of the fat components must remain undisputed. In Strubell's laboratory a method was devised for the "feeding and fattening" of staphylococci and tubercle bacilli, with great consequent increase in the lipoid content, and then these "fattened" bacilli, by grinding, were freed from their toxic protein content (the fluid thermogenic element of tuberculin, the "L-Component" of Deycke-Much, or the toxin-component of Maragliano). To this product the name of *Tubar* has been given. Tubar has been employed as a vaccine for three and a half years by Strubell and his colleagues with great success. It is used in dilutions of from 1 to 100,000 million to 1 to 10,000 million in doses of 0.25, 0.5, 0.75 and 1.0 cc.

subcutaneously. A course of 32 injections is used in daily or weekly doses. It is often necessary to repeat the course of treatment once or twice with an interval of six or eight weeks intervening. Cases showing much clinical activity are not amenable to treatment. Defervescence of patients with high initial temperature occurred after the fourth dilution was administered. Cough, expectoration and auscultatory phenomena also disappear. No ill effects have been noted, with the exception of a mild hyperemia about the diseased focus when the strongest dilutions were used. Hemoptysis has never occurred. Tubar prepared from bovine bacilli gives a stronger reaction when injected intracutaneously than does that from human bacilli. Tubar offers the advantage that it is a *single* antigen applicable to the ambulatory treatment of tuberculosis patients of types I and II.—*Über die Masttuberkelbazilleneinheitvakzine Tubar, A. Strubell, Mütch. med. Wchnschr., February 25, 1921, lxviii, 239.*

Effect of Fats on Acid-Fast Bacteria.—An emulsion of chaulmoogra oil from *Teraktogenus Kurzii* in chaulmoogra oil soap was used with favorable results on three leprosy patients. The emulsion was of high dispersion and well tolerated on intravenous injection. The soap appeared to be the more active constituent, as nearly clear Berkefeld filtrates from such emulsions were almost as effective. The action of the sodium soap of chaulmoogra oil on various acid-fast microörganisms was found to be as follows: Growth of the avian bacillus in glycerol broth was inhibited by a concentration of 1:500,000, the oil being in this respect 25 times as effective as tricresol, 50 times as active as phenol, and one-fourth as effective as potassium gold cyanide. The tubercle bacillus of the human type was inhibited at a concentration of 1:200,000, while 1:100,000 was required for a number of saprophytic acid-fast bacilli. Non-acid-fast bacteria, such as B. subtilis, B. anthracis, B. typhosus, and Staphylococcus aureus proved to be much less susceptible. Oils similar to chaulmoogra oil in composition, but of different origin, from various members of the plant family *Flacourtiaceae*, had a similar specific action on acid-fast organisms. Codliver oil was also highly inhibitory to the same group. When these oils were treated with iodine this effect was to a large extent lost, unsaturation thus being apparently a vital factor in their bactericidal or inhibitory action. Tuberculous patients, given chaulmoogra or codliver oil, reacted with fever, probably because of the destruction of bacilli and liberation of toxin. Therapeutic indications are therefore similar to those for tuberculin. The favorable effect of codliver oil in tuberculosis is chemotherapeutic, not tonic.—*Chemotherapeutische Versuche mit Fetten an Kulturen säurefester bacillen, A. Lindenberg and B. R. Pestana, Zeitschr. f. Immunitätsforsch u. exper. Therap., June 20, 1921, xxxii, 66.*

Sulphur Dioxide and Tuberculosis.—Practically all men exposed to inhalations of sulphur dioxide are immune to tuberculosis. This known fact has led physicians to experiment with the gas in treating tuberculosis and the treatment is still in the experimental stage. Only incipient cases should at first be selected. The gas is neither irritating nor harmful if care is used in its administration. Failure in treatment is due to several causes: (1) unsuitable cases, that is, longstanding chronic cases and those too far advanced; (2) fibroid phthisis; (3) using the gas too strong, or too often, or prolonging the time for inhalations; (4) using impure gas. Only the pure gas, made from powdered sulphur, should be used. This gas is liquefied under pressure and sold in tanks. A pound will last a month. The patient shows marked improvement within a day or two after beginning treatment. In about two weeks' time he hardly coughs at all except for a few minutes on arising in the morning. He then gets rid of the mucus which has accumulated during the night. The temperature and pulse come down and the patient increases in weight. He must be impressed with the fact that care must be exercised in taking the inhalations or he may add to his already irritated lung condition. Usually three inhalations a day of from fifteen to twenty minutes' duration are sufficient: one on getting up in the morning, one before the midday meal, and one late in the evening. After he has shown marked improvement, the noon inhalation may be omitted. The strength of the gas should be about five parts per million of air. Some patients, after an inhalation, get a fit of coughing when they go out in the open air. These patients are advised to stay indoors for fifteen or twenty minutes before venturing out of doors. Patients at all times must refrain from much talking.—*The Treatment of Pulmonary Tuberculosis with Sulphur Dioxide, F. Tweddell, Med. Rec., August 27, 1921, c, 367.*

Ocular Tuberculosis Treated with a Gold Preparation, Krysolgan.—This preparation is no panacea, but when employed in conjunction with other well-recognized

measures in treatment of tuberculosis of the eye, it has proved remarkably beneficial. Its action consists in the stimulation of the formation of granulation tissue; although some have maintained that in the tissues it was bactericidal because of its katalytic action. The author treated 168 cases of various types of tuberculous eye lesions by krysolgan and tuberculin combined, and although he gives no statistics he says that it is his firm belief that this form of treatment is second to none. In many he obtained healing, with or without preservation of function. In two cases of sympathetic ophthalmia the process in the second eye was stopped in three and four days respectively by such treatment.—*Weitere Erfahrungen mit Krysolganbehandlung tuberkuloser Augenkrankungen, O. Schnaudigel, Münch. med. Wchnschr., May 13, 1921, lxviii, 575.*

Test of Cure in Pulmonary Tuberculosis.—When can a patient be considered cured? Neither physical examination nor X-ray information can give unquestionable assurance that a tuberculosis is cured. Too much importance must not be attached to positive tuberculin and complement fixation reactions. As a preliminary requirement in establishing a diagnosis of relative cure, we must demand an absence of bacilli in the sputum after it has been homogenized and centrifugated. Inoculation of the sputum into a guinea pig should be negative; also the protein reactions. Total absence of expectoration, though desirable, cannot be required. The weight and blood pressure must be satisfactory, and constant for a long time. There must be no prolonged rise of temperature after muscular exercise. There must be no morbid respiratory signs. Very important among these signs is a long absence of morbid sounds during prolonged inspiraton following a cough, either in the *zone d'alarme* of Chauvet and Sergent, or in the sternocleidomastoid fossa of Ramond, or at the external border of the subclavicular crux, at the anterior border of the trapezius, where the first abnormal signs appear. But, should all these signs be favorable, can the patient return to work? If there is absence of symptoms for a year or more the patient should be given the progressive work test. It extends over three months, beginning with a few hours' work every second day. The number of hours is increased gradually, and during the third month work is continuous. Since 1904, there have been 432 patients, considered cured, submitted to this test. Of these, 322 have maintained their relative cure, some for as long as eighteen years. There have been 110 relapses. The patients have had both active and sedentary occupations in city and country. Occupations requiring great exertion were excluded. The time of year most favorable for beginning the test is the end of summer or the beginning of autumn.—*Une épreuve de guérison de la tuberculose pulmonaire, L. Rénon, Rev. d. l. tuberc., 1920, i, 20.*

A Prognostic Classification of Pulmonary Tuberculous Lesions.—Fränkel has attempted to make a classification based upon pathological alteration which will express at the same time the prognosis of the case in question. The following points are determined: 1. Open or closed type of lesion. 2. Degree of fever. 3. Extent and distribution of the disease. 4. Anatomic form of lesion: (1) cirrhotic, cirrhotic-nodular, nodular-cirrhotic; (2) (acinar) nodular; (3) lobular, exudative and lobular caseous (bronchopneumonic); (4) lobar, caseous (pneumonic), and (5) presence or absence of cavities. Those anatomic types of lesion with favorable prognosis are placed first, under heading 4, while the more unfavorable types are in a lower classification. After a discussion of several previous classifications made by pathologists, he finds them inapplicable to the clinician's needs and suggests the above. An experienced diagnostician with the aid of the X-ray should be able to so classify his cases before death.—*Ein Schema zur prognostischen Einteilung der bronchogenen Lungentuberkulose auf pathologisch-anatomischer Grundlage, A. Fränkel and S. Graff, Münch. med. Wchnschr., April 15, 1921, lxviii, 445.*

The Prognostic Significance of the Cutaneous Reaction to Old Tuberculin and to Partial Antigens in Tuberculosis.—After a review of the literature, the author deduces the following fundamental principles upon which he bases his theory of the skin reaction in a tuberculous individual: 1. The cutaneous tuberculin reaction is strong because many antibodies are present and, therefore, from combination with the antigens, anaphylotoxin is split off. 2. The cutaneous tuberculin reaction is weak or absent, (1) because too few antibodies are present allowing the absorption of much of the antigen, (2) because so much antibody is present that the antigen is quickly reduced to a nontoxic end-product, (3) because of the absence of tuberculosis and a consequent absence of antibodies, and (4) because of nonspecific influences. In attempting to obtain information of value in prognosis, Kammerer used intra-

cutaneous old tuberculin in dilutions of 1:100, 1:1,000, and 1:10,000. Careful note was made of the extent of the infiltration, the extent and intensity of the erythema, and the occurrence of vesicles, pustules, necrosis, nodulation, lymphangitis and lymphadenitis. The clinical material consisted of a large number of cases which were either definitely nontuberculous suspected of being tuberculous, or were proved to have tuberculosis of various degrees of severity. Readings of the skin reactions were made daily, but most frequently on the fourth, fifth and sixth days. After an analysis of all the cases, Kammerer concludes that only the strong reactions are of value in determining a prognosis, for reactions of a moderate grade (neither strong nor weak) occur in fully 50 per cent of all the cases which manifested all the stages of progress. This failure led to a repetition of the tests, using Much's partial antigens, both the M. Tb. R. (the lactic acid residue of tubercle bacilli) and the single antigens, A., the albumin, F., the fatty acid lipoids, and N., the neutral fats. The M. Tb. R. was used in three dilutions, 1:10 million, 1:100 million, and 1:1,000 million. The reactions on cases of all types were weak and confusing. Seventy-eight patients were then given simultaneous intracutaneous injections of A., F., and N., in the following strengths: A. 1:10 million, F. 1:10,000, and N. 1:1,000. Most of the cases were clinical pulmonary tuberculosis in various stages. A few were nontuberculous, but no clear cut evidence of value in prognosis was obtained. The author states that on the whole he thinks that partial antigens are less serviceable than old tuberculin for purposes of prognosis. He then considers briefly the work done by various investigators on the effect of nonspecific influences on the tuberculin skin reaction. Among such substances he mentions potassium iodide, thyroid extract and benzol, and typhoid inoculations which have been used experimentally to influence the condition of allergy in animals. Moreover, he mentions the influence of acute infections, old age and malnutrition. He shows that when the body is vigorously engaged in the desaturation of antigen the cutaneous reaction becomes weakened, not only to the specific antigen used, but to others as well. On the face of such frequent nonspecific influences which affected the reaction, he was led to seek a solution of the problem in the so called "sensitizing reaction" with O. T. This consists in the injection of a given dose of O. T. and repeating the dose in 8 days, perhaps in the opposite arm. The second reaction is very much more severe than the first, as the result of the sensitizing action of the first dose; a condition, analogous to anaphylaxis, results from the second injection. He considers the mechanism to be a mobilization of antibodies from the focus through the circulation to the skin rather than a sudden new formation of antibodies. One hundred and three cases were given primary injections of O. T. in three dilutions (1:100, 1:1,000, 1:10,000), each 0.2 c.c. in the right arm. Controls were made daily for five to six days. On the eighth day the same doses were repeated in the left arm. Sixty-six of the cases showed an increased reaction to the second dose, while 37 were of the same strength or decreased. The striking feature, however, was that 52 of the 66 cases with increased reaction showed a very rapid development, with an equally rapid subsidence of the local signs. This is again proof of the anaphylactic nature of the reaction, he thinks, and may be explained as a rapid and complete destruction of the protein molecule. From an analysis of his results he concludes that in cases having a favorable prognosis the second reaction will be increased, while the unfavorable case will show a second reaction, either the same as the first or less in degree. The healthy individual or one with only slight disease reacts definitely and strongly to the second injection because the sensitizing dose either mobilizes antibodies or new ones are formed. The sensitizing reaction was likewise repeated, using Much's partial antigens in the same manner, but it was difficult to differntiate between mild and severe types of cases. Likewise, O. T. and partial antigens were used in combination, but without any particularly striking results.—*Was bedeuten die kutanen Reaktion mit Alttuberkulin und Partialantigenen, für die Prognose der Tuberkulose? D Kammerer, Münch. med. Wchnschr., March, 1920, lxviii, 375.*

Scientific Methods for Obtaining Tuberculosis Morbidity and Mortality Statistics.—Besides the measures in general use for learning the number of tuberculous persons, there is one which ought to be made compulsory by all governments, namely, a rigorous bacteriological examination of the sputum of all persons. Only in this way can almost every case of tuberculosis be brought to light.—*Les méthodes scientifiques de diagnostic clinique de l'infection bacillaire aux différents ages, en vue des enquêtes a entreprendre dans les divers pays sur la morbidté et la moralité par tuberculose, M. L. Renon (France), Conférence internationale contre la tuberculose, Paris, October 17–21, 1920, Masson et Cie, Paris, 1921, p. 41.*

All children should be methodically tested by tuberculin. After ten, examination by X-rays should take the first place, and as these examinations should be general there ought to be adequate provision for X-ray and bacteriological laboratories. Free dispensaries should be everywhere, and civil and military medical bodies should be organized for systematic research.—*G. A. Alfaro and J. C. Navarro* (*Argentine Republic*), *Ibid., p. 49.*

The experimental study of tuberculosis should be removed from general research laboratories and carried on in special laboratories that ought to be established in all large cities and in some smaller ones. From these it should be possible for practitioners to obtain aid in making diagnoses, and it should be obligatory to send to them all suspected material, including the sputa of patients with catarrh. There should be compulsory notification of all germ carriers. Laboratory research ought to include new investigations in the classification of the tubercle bacillus. Its pleomorphism, its acid-resistance during its pathogenic period, its resistance toward all therapeutic measures, and other features possessed by it almost exclusively, all point to the need of a revision in our studies of the tubercle bacillus, a revision which may lead to the discovery of a specific therapy. Its pleomorphism seems to be derived from its efforts at adaptation, and its changing forms are associated with distinct physiological properties which complicate the problem of its study. The germ belongs in the region between the bacteria and the spirochetes. It appears to lie nearer to the latter, that is, it is among the higher bacteria. It is markedly distinguished from its kind by an almost keratinous envelope which furnishes a feature for classification. Four forms may be distinguished: large, short, almost completely segmented germs with an hour-glass-shaped envelope and nearly spherical contents; rods of the classical form with almost imperceptible envelopes; very long rods without visible envelopes. These three forms have five different kinds of grouping: right, obtuse and acute angles, parallels and isolated individuals. Form and grouping are considered together as guides in diagnosis. The first form indicates a condition so grave that cases in which it is seen usually run their whole course within a year; they seldom have hemorrhages, but when they do these are severe. The groups are nearly always right angled, very numerous, and greatly adulterated, especially with pyogenic forms. The second form is associated with slow disease—sclerotic forms of pulmonary consumption. The grouping is acute angled, loose as if the members were about to separate, which they do in the less grave cases. There is sometimes contamination; sometimes not. The third form is seen in less serious cases with long quiescent intervals. The grouping is parallel and the fields are free from contaminating germs. These cases have the most hemorrhages, and it is this and not the evolution of the tuberculosis that constitutes the gravity of cases in which it occurs. In the fourth type, very mild, with long intervals of good health and no fever, the germ is found isolated.—*A. E. y Capo* (*Spain*), *Ibid., p. 52.*

The different parts of the complex problem of tuberculosis statistics ought to be considered separately. An international agreement ought to be established by which the morbidity statistics of different countries would be comparable. The difficulties of diagnosis are so great and so much time is required for a careful diagnosis that the formulation of satisfactory statistics must perhaps wait upon the evolution of simpler methods.—*E. Bachmann* (*Switzerland*), *Ibid., p. 114.*

In Norway the mortality from tuberculosis has diminished greatly in the past seventeen years. The decrease is confined almost to the first five years of life. The same thing has been observed in Sweden and Denmark. An important fact brought out is the constant annual mortality which seems not to accord with acute infection during maturity. Norway requires registration of deaths and of new cases. In limited regions there has been an examination of whole populations. Pirquet tests have demonstrated that the denser the population the greater the percentage of positive reactions. In the free schools of Christiania 80 per cent of the children, seven and eight years old, were positive; and in the country the percentage was 30 to 40 per cent. In some isolated regions where no deaths from tuberculosis were known, 40 to 50 per cent of all the inhabitants gave positive Pirquet reactions, and 50 to 60 per cent gave negative reactions. In the most remote districts not a single child under fifteen reacted positively.—*N. Heitmann* (*Norway*), *Ibid., p. 118.*

Diffusion of Tuberculosis Throughout the World.—Recent work has brought to light the following facts concerning the distribution of tuberculosis. In 1908 Cummins found it absent among the natives, with the exception of a few imported cases, in the Sudanese province of Bahr-el-Ghazal.

Ziemann did not find it in the Kamerun Hinterland, among the Douali tribes, but it was quite frequent in Natal, among the Zulus, in the Transvaal and in Madagascar; while it existed with almost the same intensity as in Europe in all the urban populations of North Africa, but was rare among the Arabs and Berbers who lived as nomadic tribes south of the Atlas Mountains. In 1911 Otto Peiper observed that tuberculous infection was very rare among the negroes of East Africa who lived in huts in the native villages and who did field work, but it was common in the communities where these people came in contact with Hindus, Arabs and Europeans: for example, at Kilua, in a single school, 23 per cent of negro children, 100 per cent of Hindu children and 20 per cent of Arab children gave positive Pirquet reactions, while in the same locality adults reacted in the proportion of 17 per cent among the negroes and 25.4 per cent among the Hindu immigrants. In the Kamerun 3.6 per cent of the adults were infected; but tuberculosis has since made rapid progress here, propagated by commerce and the return of transient immigrants. Throughout West and Equatorial Africa there no longer exist peoples who have been entirely spared, except several nomadic tribes who live on the borders of the desert zones of the Sahara and of Nubia. The same is true of Australia and the Oceanic islands. In the cities of Europe infection by the time adolescence is terminated is practically universal. In rural districts, except where the population is comparatively dense, the proportion of the infected is often much less. In a French east coast village, Stephen Burnet, submitting seventy-five children, from 0 to 10 years, to the tuberculin test, found none infected at the age of five, two at six years, four at seven years and nine in the tenth year. On the other hand, Hillenberg, in a part of Germany where pulmonary tuberculosis is very rare, testing eight hundred and ten healthy children, got 20 per cent of positive reactions from six to ten years and 31.5 per cent from eleven to fifteen years. The studies of Metchnikoff, Burnet and Tarassewitch, among the Kalmuks, a pastoral people of the Volga basin, showed that in the central part of the Steppes, a region where few of the inhabitants lived in cities, 69.4 per cent of the adult men and only 30.6 per cent of adult women reacted positively, while at the border of the territory, where commercial relations with the Russian population are very active, the men gave 95.7 per cent and the women 88.5 per cent of positive reactions. Isolated peoples have comparatively slight resistance to the disease. For instance, among the Senegalese who came to France during the war, and the youth of Bosnia and Herzegovina who were drafted into Austrian regiments, the disease frequently took a fulminant course which was analogous to what we observe in Great Britain and France among young children exposed to massive familial infection. On the other hand, the Jews, in the miserable environment of the ghettos of Lemberg and Cracow, are more resistant. Human tuberculosis is therefore a consequence of civilization. The same features are true of animal tuberculosis. The wild cattle of Madagascar or of the Argentine pampas were free from it. Domestication has caused it to appear among them, and it has become more frequent and more serious among the herds submitted to prolonged confinement in stables than among those who pass their existence in the comparative freedom of the pasture. Human tuberculosis is distributed throughout the world exclusively by the sowers of virulent germs. In the greatest number of instances these are consumptives who spread infection through sputa and excreta. But these are not alone to blame; for it has been established that many apparently healthy subjects, the bearers of latent or occult lesions, and detectable only by tuberculin reactions, intermittently eliminate bacilli with their glandular and intestinal excretions and thus scatter infection. Schroeder and Cotton, as long ago as 1906, showed that calves eliminate bacilli in their dejecta, while Calmette and Guérin, and Joest and Emshoff have demonstrated the frequency of the elimination of tubercle bacilli through the bile of both naturally and artifically infected animals. This work has been confirmed by Breton, Mézie and Bruyant (1912), Titze and Jahn, and Lydia Rabinowitsch (1913), while Nobécourt and Bernard showed the frequency of bacillary elimination by the kidney in different forms of childhood tuberculosis. Bacillary excretion through the mammary gland has been definitely established by many authors; while, if we are to believe the results of a number of observers, it would appear that the case is not different among human beings. The graver forms of tuberculosis may result generally from frequently repeated infections which occur from prolonged cohabitation with intermittent sowers of bacilli. It seems, therefore, that when tuberculosis appears in places where no consumptives are discoverable, it has been introduced by healthy bearers of occult tuberculosis who are distributing virulent germs by their excretions or by certain glandular secretions. Explorers, navigators and merchants have been potent spread-

ers of infection. While it is without doubt that the manifestly phthisical are the principal factors in the dissemination of the disease, we must nevertheless guard humanity against the possibilities of infection from innumerable people who are in appearance perfectly healthy, but who are slightly infected with lesions limited to the lymph nodes, which may remain indefinitely latent and yet be capable of spreading infection. One can hope to protect the children and populations of countries which are yet relatively spared only by some system which will bring about the general and judicious employment of local tuberculin tests and the clinical examination of the lymphatic system, principally by the X-rays. It is evident that we cannot interdict the social and commercial intercourse of healthy though suspected subjects, yet we may hope to render them inoffensive by appropriate surveillance and education. In every country antituberculosis work and sanitary service must take this direction.—*Les modes de diffusion de la tuberculose a travers le monde, A. Calmette, Rev. d. l. tuberc., August, 1921, 3rd Ser., ii, 235.*

Tuberculosis Statistics, New York City, May-July, 1921.—

	MAY, 1921	JUNE, 1921	JULY, 1921
New cases of pulmonary tuberculosis reported in New York City	1,058	1,204	1,105
Total cases of pulmonary tuberculosis on record last day of month	26,509	26,669	26,890
Deaths from pulmonary tuberculosis in New York City	469	447	393
New York Tuberculosis Association, attendance at educational exhibit	2,693	2,561	1,975
Association of Tuberculosis Clinics, new patients examined*	2,011	2,018	1,661
Association of Tuberculosis Clinics, total attendance*	10,504	10,176	8,618

*Includes all patients, tuberculous and non-tuberculous.

—Tuberculosis Statistics, Bulletin New York Tuberculosis Association, September–October, 1921, ii, no. 4.

Tuberculosis Mortality in New York City According to Sex.—Almost twice as many men as women die from tuberculosis in New York City. Since 1910 the number of deaths of women and female children, from all forms of tuberculosis, has been 31,148, whereas the deaths of men and male children in the same period have totalled 67,748. The percentage is 64 for men and 36 for women. The Federal Census figures now at hand show that the population in New York is practically evenly divided between the male and females sexes, there having been found 2,802,638 males and 2,817,410 females at the time of the enumeration on January 1, 1920. The death rate per 100,000 in each sex is shown in the accompanying table:

New York City—Deaths from all forms of tuberculosis in each sex, 1910 to 1921

YEAR	NUMBER OF DEATHS			DEATH RATE PER 100,000	
	Males	Females	Per cent males	Males	Females
1910	6,352	3,722	63.1	266	155
1911	6,548	3,702	63.9	269	152
1912	6,465	3,516	64.8	261	142
1913	6,362	3,669	64.5	252	145
1914	6,716	3,574	65.3	262	139
1915	6,638	3,611	64.8	254	138
1916	6,185	3,463	64.1	233	130
1917	6,607	3,535	65.2	245	131
1918	6,318	3,780	62.6	231	137
1919	5,346	3,152	62.9	192	113
1920	4,211	2,424	66.0	149	85

In 1910 the death rate in New York City from all forms of tuberculosis was 266 per 100,000 among males and 155 among females. In 1920 it had come down to 149 in the male sex and 85 in the female. The first striking difference, of course, is the constantly higher death rate among those of the male sex; and, secondly, the almost equal decline in both groups, namely, 44 per cent reduction in the death rate among males as against 45 per cent among females. This decline has continued so far this year, and we therefore have the encouraging knowledge that in the past eleven years alone the death rate from tuberculosis in this city in both sexes has been cut in half. Among females, this reduction has occurred even though it began from a much lower point than that of the males. In either sex, the diminution has not yet approached the irreducible minimum.—*Tuberculosis in New York City Attacks Men Especially. Bulletin New York Tuberculosis Association, September–October, 1921, ii, no. 4.*

Tuberculosis among Negroes in New York City.—The problem of the care of tuberculosis in New York is rendered somewhat more difficult by the present large colored population of this city. The Federal census figures, just available, reveal that there are now living here 161,852 colored people. In 1910 they numbered only 93,028. In Manhattan, a large number of them are clustered together in the Harlem district and on the West Side above 59th Street. With the high incidence of tuberculosis in this group of the city's population, the largest clinic attendance is now reported at the Harlem Hospital Tuberculosis Clinic. The deaths among the colored in this city number approximately 625 annually, and the details of the annual mortality since 1910 have been as below:

Mortality, from tuberculosis of all forms, in New York City, among the colored and the white population, since 1910

YEAR	DEATHS		DEATH RATE PER 100,000	
	Colored	White	Colored	White
1910	574*	9,500	617	202
1911	633*	9,617	638	201
1912	643*	9,338	609	192
1913	606*	9,425	542	191
1914	645	9,645	546	192
1915	653	9,596	486	189
1916	574	9,074	440	175
1917	580	9,562	424	182
1918	642	9,456	449	177
1919	706	7,792	471	144
1920	597	6,538	384	119

* From United States Mortality Statistics. The figures since 1914 are from the New York Department of Health Reports.

The death rate among the colored, in 1910, was 617 per 100,000 inhabitants, whereas it was only 202 among the white population. In 1920 it had fallen 38 per cent, and was 384 as compared with 119 among the white. The reduction in the death rate from tuberculosis of all forms in the white population, in the same period, was 41 per cent. In both years the death rate among the colored was more than three times as great as that among the whites. The problem of caring for tuberculosis among the former is therefore much greater than it would be for a white population of the same number.—*Tuberculosis among Colored People in New York City, Bulletin New York Tuberculosis Association, September-October 1921, ii, no. 4.*

Tuberculosis in the South Sea Colonies.—Pirquet tests were made on 760 natives of the South Sea Colonies. The inland villagers having very little intercourse with outsiders (of whom 44 were examined) were all negative. With advancing order of civilization, and thus opportunities for tuberculosis contact, were the *Untere Wariadörfer*, of whom 12.6 per cent were positive; *Morobedörfer*, 13 per cent; *Bogadjimdörfer*, 17 per cent; *Namalos*, 27.3 per cent; *Krankenhaus Friedrich Wilhelmshafen*, 28.2 per cent; and *Sulkasiedlungen*, 32.7 per cent. The positives were always higher among the men than women. Among the children there were very few positive cases. Tuberculosis was not a common disease in these colonies in 1912 and 1913, but civilization, favored by unhygienic conditions, brought it into being. Bovine infection was excluded. The clinical form is mainly pulmonary tuberculosis, and its course is especially rapid and fatal as a result of the absence of a relative immunity in the natives.—*Zur Tuberkulose in der Südsee, H. E. Kersten, Beitr. z. klin. d. Tuberk., March 15, 1921., xlvii, 117.*

Tuberculosis among Catholic Nursing Orders.—In 1889 Cornet called attention to the high tuberculosis mortality in the Catholic nursing orders in Germany, which he attributed to the nursing and especially to infections resulting from careless handling of the sputum. The tuberculosis mortality among the Austrian nursing orders is also high. An analysis of the cases among 2230 sisters and 143 candidates revealed that, of 1852 without hereditary predisposition, 777 (41.9 per cent) developed tuberculosis, while of 521 with hereditary predisposition there were 330 (63.3 per cent). Of the candidates, 39.9 per cent were afflicted, while of the sisters there were 46.5 per cent; which would lead to the conclusion that the first infection in the majority of the cases occurred before entrance to the convent. These figures agreed well with the cutaneous test, which was as frequently positive among the candidates as among the sisters. The kindergarten teachers and other teachers have a high morbidity and are poorly paid, besides being selected from the more intelligent class of individuals. The kitchen personnel has a lower morbidity, the better nourishment being a probable instrumental factor. Repeated infection in the convent is of far more importance than that resulting from nursing. Convent life also reduces resistance and lights up old dormant lesions. Morbidity and mortality are greatest in the younger age groups and diminish with age,

which does not agree with the finding among the general female population, where the morbidity and mortality begin to diminish definitely with the climacterium. The ratio of mortality is about the same in all age groups, the deaths being about one-third of the afflicted, the remaining two-thirds recovering and spreading the disease. Of all the afflicted, 414 had pulmonary tuberculosis, 305 caries of the ribs, 77 lymph node tuberculosis, and 36 spinal caries. Blood was expectorated by 401, and only 57 revealed bacilli, probably because of the small percentage whose sputum was examined. The Pirquet reaction was positive in 84 per cent of the new candidates, and in 88 per cent of 482 novices and sisters. Specific treatment seemed to have a slight prophylactic value. Certain recommendations for improvement in predisposition prophylaxis are advocated, including cleanliness in the convents, uniform heating, warmer clothing, increased food including 60 grams of fat daily, graduated work for healthy and ill, baths at least once a week and daily sponges, sleep at least eight to nine hours daily, and prophylactic specific treatment before the appearance of manifest tuberculosis. The recommended exposure prophylaxis includes separate beds for sick and well, early discovery of the disease, sick history book for each nurse, disinfection of beds, clothing and all utensils after every illness, and sputum and cough discipline with the use of sputum cups properly cared for and cleaned.—*Die Tuberkulose in katholischen Krankenpflegeorden, A. Kutschera-Aichbergen. Beitr. z. Klin. d. Tuberk., March, 1921, xlvii, 54.*

Contagiousness of Pulmonary Tuberculosis in Infants.—Two cases are reported. one a girl two and a half years old, the other an infant three months old. The poss bility of infection of either of these children by any member of the family is excluded. An older child in each of the families soon developed acute miliary tuberculosis or tuberculous meningitis. It seems fairly certain that the two reported cases were responsible for the development of fatal tuberculosis in the other children mentioned. The sputum in the two original cases was negative for tubercle bacilli on several examinations. The sputum was swallowed. This shows the difficulty of accurate work on the contagiousness of tuberculosis in infants, and the necessity for further research on this subject.—*Sul problema della contagiosità della tubercolosi pulmonare dei primi anni di vita, O. Cozzolino, La Pediatria, July 15, 1921, xxix, 634.*

Tuberculous Infection of a Child.—A boy seven years old, previously negative to tuberculosis by the Pirquet and intracutaneous tests (0.01 and 0.1 gm.), became infected within twenty-four hours, while sleeping in a room in a bed 4 metres from an adult girl who was suffering from open pulmonary tuberculosis with hemoptysis. The boy and a younger brother slept in the room; the older boy (who became infected) played quite a part of the time at the bed of the sick girl but did not kiss her. Both boys after returning home were repeatedly examined by Pirquet and intracutaneous tests. The intracutaneous test became positive after forty-six days in the older boy, while the Pirquet test did not become positive until after sixty-seven days. At no time before or up to a year after infection did the boy show clinical tuberculosis.—*Über Tuberkuloseinfektion, W. Unverricht, Berl. klin. Wchnschr, October 25, 1920, lvii, 1019.*

Danger of Tuberculous Infection in Advanced Childhood.—A rapid acute tuberculosis is described in two children, five and six years of age, in which infection, occurred five and twelve and one-half months before death. It is concluded that in relatively rare cases tuberculous infection, which may rapidly lead to death, can occur in advanced childhood.—*Über die Gefährlichkeit der Tuberkuloseinfektion im höheren Kindesalter, K. Peyrer, Beitr. z. klin. d. Tuberk., March 15, 1921, xlvii, 164.*

The Fate of Children of Tuberculous Parents During the War.—Children of pulmonary tuberculosis parents (patients at the University Clinic of Bonn) were found victims of the same disease in a proportion of 54.2 per cent. In the case of maternal tuberculosis more children were found to be tuberculous than in the case of paternal tuberculosis. In families with a larger number of children the percentage of incidence and mortality is higher than in families with but few children. The highest incidence and mortality occurs in children, one to five years of age, and immediately before and after puberty.—*Über des Schicksal der Kinder tuberkulöser Eltern während der Kriegszeit, J. W. Langendörfer, Ztschr. f. Tuberk., June, 20 1920, xxxii, 150.*

Housing Conditions vs. Food as Factors in the Increased Incidence of Pulmonary Tuberculosis.—In order to ascertain whether the marked increase in incidence of pulmonary tuberculosis in Rostock (a city of 70,000 inhabitants) was due to poor housing or to inadequate food

conditions following in the wake of the war, 356 clinic cases of active pulmonary tuberculosis were studied. Their living quarters were classified according to the following standards: number of rooms, lighting, air, cleanliness and number of occupants; whether they contained a kitchen and at least one heatable room; and whether the patient alone occupied the bed. The living quarters of these patients were classed as "good" according to the above mentioned standards in 66.6 per cent; as "moderately good" in 16 per cent; as "poor" in 16.3 per cent; and as very poor in 1.1 per cent. The author does not consider these figures as being sufficiently bad to lay the blame for the increased rate incidence of phthisis upon housing conditions, but by a process of exclusion thinks it due rather to the well known decrease in quantity and quality of food, especially animal proteins, carbohydrates and fats.—*Tuberkulose und Wohnungsverhältnisse, W. Tobias, Ztschr. f. Tuberk., April, 20, 1920, xxxii, 1.*

Influenza and Pulmonary Tuberculosis.—Influenza was studied in 66 cases of pulmonary tuberculosis. All except 3 of these were in classes I and II Turban. In 81.7 per cent the existing pulmonary tuberculosis was not unfavorably influenced; rather, 20 per cent of these showed definite improvement. Healing was in no way retarded by the influenza. In 18.3 per cent the latter exerted an unfavorable influence, causing either an increase of the tuberculous process or detrimentally affecting the general condition (to this group belonged the 3 Turban III cases). In 6 of the 66 (9.1 per cent) cases, the pulmonary tuberculosis was apparently of primary occurrence, but in these there was either a family predisposition, an earlier scrofulosis, or a reduced individual resistance ascertainable. The course of influenza in the author's cases of tuberculosis was mild.—*Grippe und Lungentuberkulose, G. Deusch, Beitr. z. klin. d. Tuberk., November 25, 1920, xlv, 1.*

Influenza and Pulmonary Tuberculosis.—Caseous pneumonia may arise from an old tuberculous focus immediately after influenza, as a result of the entrance of tubercle bacilli into the bronchi. An old inactive focus may become active after influenza and induce progressive disease. In many cases without involvement of the lungs, latent hilum tuberculosis may set up active tuberculosis of the bronchial nodes with caseous pneumonic processes frequently of central location. There is always an interval of health of varying duration between the incidence of influenza and the latter variety of tuberculosis. Knowledge of the consequences of influenza will prevent the progress of a hilum tuberculosis of the lungs by proper treatment of apparently healthy persons in the anergic interval.—*Grippe und Lungentuberkulose, O. Kiefer, Berl. klin. Wchnschr., October 4, 1920., lvii, 951.*

Tuberculous Toxins as Causes of Disease.—Tuberculotoxin involvement of the eye and cerebral nerves in 6 cases were cured by tuberculin treatment. One of these cases was treated previously with mercury, aspirin and potassium iodide without effect, and was markedly improved by nine tuberculin injections. In the other 5 cases, turbidity of the vitreous humor and cerebral nerve paralysis disappeared promptly with tuberculin treatment.—*Die Tuberkulotoxine als Krankheitsursache, G. Hirsch, Berl. klin. Wchnschr., May 23, 1921, lviii, 549.*

The Nose as a Defense against Tuberculosis.—Besides its functions of smell and respiration, the normal nose acts as an important defense against tuberculous infection and against the inroads of established tuberculous disease. In normal nasal respiration, the commencement of inspiration draws the air from the nasopharynx, which causes the air to flow out of the sinuses. This flow continues till the end of inspiration, leaving a partial vacuum in the sinuses. When expiration begins, the last of the inspired air containing oxygen, and occupying the space above the soft palate, is drawn by negative pressure into the sinuses, and it is there held until the next inspiration. Examination of the skulls of lower animals with their infinitely complex turbinate and ethmoidal structures shows that it is next to impossible for the inspired air to pass through this region without coming intimately into contact with their structures. The study of the circulation of the air in the sinuses has shown us there, too, the intimate contact which must take place between the inspired air and the lining cells. Since these lining cells are not only ciliated but constantly moist, the inspired microörganisms must with absolute certainity be deposited on them and digested or otherwise destroyed. On theoretical grounds, therefore, it is impossible for a nose breather to be infected with tuberculosis, since no microörganisms can pass this ingenious filter, if it is in proper working order. Further experiment shows that the capacities of the nasal epithelial cells are not limited to their bactericidal action. If, in a case of tuberculosis, insufflations of suitable dosage

of bacillary emulsion of tubercle bacilli are made into the ethmoidal region, certain and constant improvement takes place. This definitely shows that these epithelial cells which line the mucosa in the upper regions of the nose are capable of forming antibodies. Hence immunity in tuberculosis resolves itself down to the establishment of a proper inspiratory current through the upper regions of the nose. Immunity in tuberculosis depends on the proper anatomical relationship of the middle turbinate bone to the septum nasi, and the physiological capacities of the epithelial cells in the upper regions of the nose.—*Immunity in Tuberculosis, O. Paget, Med. Rec., October 8, 1921, c, 627.*

The Origin of the Multinucleated Giant Cell.—The multinuclear giant cell, called the "giant cell of irritation" by Laulanie, while most often encountered in the tubercle, is by no means peculiar to it, being found in syphilis, leprosy, actinomycosis, and many other chronic infectious processes, as well as in the tissue response to the presence of a sterile foreign body. It is a fixed phagocyte. The authors studied its formation in birds and mammals. It is most readily followed in the experimental tuberculosis of fowls. It was noted that in the young tubercle produced by injection of the avian type tubercle bacillus, a portion of the epithelioid cells constituting the lesion were fused into a large syncytium, usually in the centre of the tubercle. In somewhat older tubercles a concentration of nuclei in various portions of the syncytium was seen. This was followed by fissuring of the mass in lines radiating from the centre. In the final stage, contraction occurred in the masses thus separated, with the production of typical multinucleated giant cells, continuous on the one hand with the protoplasmic processes of surrounding epithelioid cells and on the other with the debris of the now caseous centre of the tubercle. The conditions in mammalian tuberculosis are similar, although the process may be complicated by the greater resistance of the host, expressed by the formation of granulation tissue, which with lymph fills in the interstices left on the formation of giant cells by contraction. The movement of nuclei to the periphery of the giant cell is probably a chemotactic adaptation to the conditions of chronic infection, as the reduction in total surface of the many epithelioid cells taking part in its formation is a protection against the destructive influence of bacterial poisons, while, on the other hand, the size is not too large for nutrition by diffusion.—*La cellule géante. Syncytium ou dérivé de syncytium. Contribution a l'étude des granulomes, Liénaux and Hamoir, Ann. de l'Inst. Pasteur, November, 1920, xxxiv, 775.*

Bacteria on Coins.—The object of this investigation was to determine the numbers and types of microörganisms on the coins and currency being used in general circulation. The smaller values were used, since it was believed that these were passing more quickly from one person to another. *Summary and conclusion:* There seems to be little basis for the belief that coins bear any close relation to the spread of disease. The indicators of pollution used in sanitary investigations were entirely absent on the coins used in this investigation. Thirty-seven of the strains of microorganisms isolated from the coins were spore-formers, and probably spores are necessary before the organism may perpetuate itself for any considerable length of time on coins. This may explain why none of the commonly accepted indicators of pollution were found. They are not spore-forming organisms, and consequently are destroyed by the action of the metals. Since the flora of coins seems to be made up almost entirely of microorganisms which form spores it is reasonable to assume that coins might function in spreading diseases, the etiological agents of which are spore formers. It was shown in this paper that Bacillus anthracis was able to live for eighty days on pennies and seventy-one days on nickels when the experiment ended. The greatest factor tending to control the types and numbers of microorganisms on coins seems to be the metal of which the coins are made. Numerous instances are mentioned in the literature where it is shown that the metallic ions have a distinctly bactericidal effect. The same statement applies to certain of the salts of these metals. It is undoubtedly true that coins which are passing from person to person in general circulation come in contact with acids and alkalies which were the formation of soluble salts on their surfaces. These tend to keep down the bacterial flora and to probably exert a selective action, destroying the non-sporeforming organisms. Mold spores were isolated in a few cases. These probably are just as resistant as the bacterial spores, although they play a lesser rôle in the transmission of infection.—*Bacteria on Subsidiary Coins and Currency, Charlotte B. Ward and F. W. Tanner, Am. J. M. Sci., October, 1921, clxii, 585.*

Relative Value of Laboratory and Clinical Methods in Tuberculosis.—The two outstanding needs in medicine to-day are the correlation and unification of the recent scientific discoveries which have been made, and more accurate clinical observation. The opinion seems to be prevalent that laboratory and mechanical means of arriving at truth are accurate, while clinical observation is inaccurate. Yet the laboratory and mechanical measures have back of them the errors incident to the reaction and the apparatus plus the errors of the observer, while clinical observation has the errors of the observer only. There has been too much tendency to reduce things to so called normal standards. Modern medicine with its study along special lines has emphasized disease processes and methods of examination and minimized the patient. The examination of sputum is surrounded by more errors than are usually recognized. The absence of tubercle bacilli does not mean absence of tuberculosis. The disease may be present, even in a widely scattered area, and may be causing marked clinical symptoms without rupture of the tubercles or appearance of bacilli in the sputum. Moreover, the usual methods of diagnosis are subject to greater error than is generally believed. Ordinary methods of treatment and staining of sputum will detect bacilli if present in numbers of 2000 to a cubic millimetre. The most refined method, that of homogenization, will enable one to find them, if present in numbers of 200 to a cubic millimetre. Furthermore, patients with early tuberculosis may expectorate ten times a day, but expectorate bacilli only once. Sputum should be examined for albumin and lymphocytes. The complement fixation test has many sources of error; interpreted in conjunction with other data it is of value. The roentgen ray should be operated and interpreted by experts, and even in the hands of many of these, the result is frequently doubtful. Much help may be obtained from the tuberculin tests. A prompt marked reaction coincides closely with clinical activity. Intracutaneous test with 0.1 to 0.2 cc. of a 1:5000 dilution of Koch's O. T. is to be preferred. None of these methods gives an idea of the patient's resistance to the infection. One may classify the symptoms of tuberculosis into those due to toxemia, those to reflex causes and those to the tuberculous process *per se*. In advanced tuberculosis, symptoms and syndromes resulting from the disease are enumerated. In the first of these groups, general nerve and endocrine disturbances are included; in the second, symptoms due to reflex action; while the third group is most important from the diagnostic point of view. The changes found on physical examination are partly anatomic and partly physiological. The percussion note is modified by all structures adjacent to the lungs. In the apices, from the second rib upward, percussion through the tense muscles is probably more influenced by the latter than by the few tubercles in the lung in early tuberculosis. The same is true of auscultation, though to a lesser degree. Palpation is as accurate as percussion at its best. Different density in the lungs, mediastinum and pleura may be felt by light palpation. The motor and trophic changes in the muscles, skin and subcutaneous tissue, reflexly produced by pulmonary inflammation are visible to the eye and recognizable on palpation. The pulmonary motor reflex expresses itself in the muscles receiving their innervation from the cervical segments of the cord. The pulmonary trophic reflex is shown in the skin, subcutaneous tissue and muscles supplied by the cervical segments of the cord, particularly the third, fourth and fifth segments. The motor reflex produces increased tonus-spasm of the muscles and limits the respiratory movements. The pulmonary trophic reflex is indicated in degeneration of these muscles, and of the skin and subcutaneous tissue above the second rib anteriorly and the spine of the scapula posteriorly. These degenerations are evident at a glance and more so on palpation; they indicate chronic inflammation of the lung. Tuberculosis produces the greatest amount of reflex degeneration, although chronically infected bronchi, unresolved pneumonia, pulmonary abscess and other chronic infections may produce some change.—*The Relative Value of Laboratory and Clinical Methods of Study in the Diagnosis of Tuberculosis, F. M. Pottenger, Am. J. Med. Sci., September, 1921, clxii, 352.*

Clinical Diagnosis of Adult Tuberculosis in Czecho-Slovakia.—The character of the infection in the tuberculous must be judged by the sum of all the reactions which he exhibits. We must consider the amount of the tuberculin dose, the local reaction, the form of the temperature curve, the general symptoms, and the focal reaction where this is accessible to observation.—*Méthodes scientifiques de diagnostic clinique de la contagion bacillaire chez l'adulte dans les stations de la République Tchéco-Slovaque, K. Franz (Czecho-Slovakia), Conférence internationale contre la tuberculose, Paris, October 17–21, 1920, Masson et Cie, 1921, p. 119.*